



Instruction Manual

DV08

***Screw-spindle volumetric flow meter
for highly viscous liquids***



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Safety Information

General Instructions

To ensure safe operation, the device should only be operated according to the specifications in the instruction manual. The requisite Health & Safety regulations for a given application must also be observed. This statement also applies to the use of accessories. Every person who is commissioned with the initiation or operation of this device must have read and understood the operating instructions and in particular the safety instructions!

The liability of the manufacturer expires in the event of damage due to improper use, non-observance of this operating manual, use of insufficiently qualified personnel and unauthorized modification of the device.

Proper Usage

The flow meters of the DV08 series are used to measure and display the flow rates of viscous, self-lubricating liquids. Any other use is considered improper.

In particular, applications in which shock loads occur (for example, pulsed operation) should be discussed and checked in advance with our technical staff.

The devices of the DV08 series must not be used as the sole agents to preventing dangerous conditions on machines and systems. Machines and systems must be designed in such a way that faulty conditions lead to a dangerous situation for the operating personnel.

Dangerous substances

For dangerous media such as e.g. Oxygen, Acetylene, flammable or toxic substances as well as refrigeration systems, compressors, etc. must comply with the relevant regulations beyond the general rules.

Qualified Personnel

Devices of the DV08 series may only be installed by suitable trained specialist personnel who are able to install the devices properly. Qualified personnel are those persons who are familiar with the assembly, installation and commissioning of devices of this type and who are appropriately qualified.

Inward Monitoring

Please check directly after delivery the device for any transport damages and deficiencies. Additional with reference to the accompanying delivery note the number of parts must be checked.

Claims for replacement or goods which relate to transport damage can only be considered valid if the delivery company is notified without delay.

Functional description

The flow meter DV08 is used for quantitative flow measurement of viscous liquids. The liquid flow causes two screw spindles to rotate in opposite directions. A magnetic pre-tensioned hall sensor located outside the flow chamber detects the screw flanks and generates a flow-proportional frequency signal. Two pulses corresponds to one revolution of the screws and thus to a certain measuring volume. There are no magnets in the flow chamber.

Installation and commissioning

The Dv08 flow meters are in-line devices with either an aluminium adapter with female thread or a SAE flange with female thread on the process side. No special inlet or outlet sections are required.

- Check that the maximum pressures and temperatures specified for the devices are not exceeded by the pressures and temperatures in the process and that the materials used in the device for the parts in contact with the product are not attacked by the medium.
- Make sure that the pipes have been cleaned and flushed prior to installation and that there are no foreign objects in the pipe.
- Pressure surges caused by sudden changes in flow may damage the unit. Care must therefore be taken to open valves slowly to avoid pressure surges.

Output signals

The Dv08 flow meters can be equipped with various electronics which provide different output signals.

Pulse output

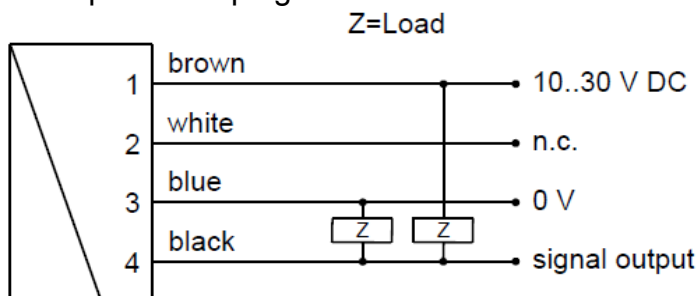
Depending on the size, the DV08 delivers a certain number of pulses per litre:

Connection size	Meas. range l/min	Volume/Pulse	Pulses/Litre
G 1	1,4...140	13,1	76,3
G 1 ¼	3,5...350	29,0	34,5
G 1 ½	5,5...550	48,6	20,6
G 1 ½	8,0...800	72,0	13,9
G 2	10,0...1000	103,6	9,7
G 2	15,0...1500	133,0	7,5
G 2 ½	25,0...2500	238,8	4,2

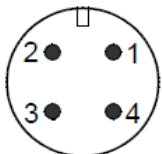
The push/pull output ... IW (with cube plug) or ...IR (with round plug) is compatible with all standard PNP or NPN inputs.

Electrical connection: push-pull output

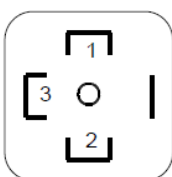
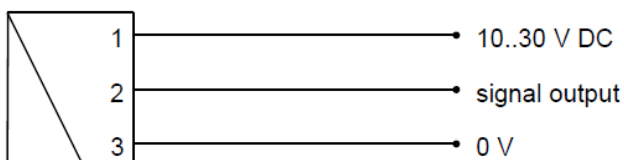
with 4-pin round plug connector



Connection example: PNP NPN



with cube plug according to DIN 43650-A / ISO 4400



Frequency converter

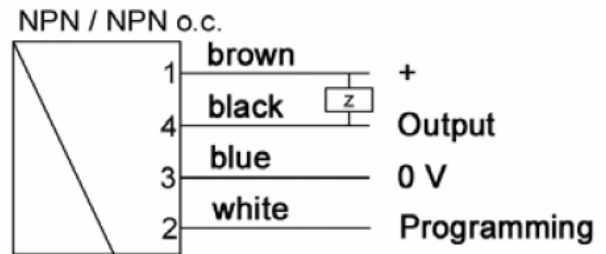
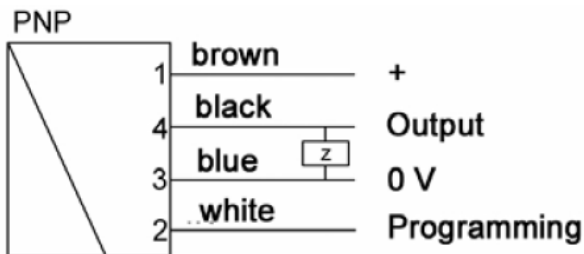
The frequency converter supplies an output frequency proportional to the flow rate. The final value can be set at the factory according to customer requirements and can be up to 2 kHz. If no end frequency is specified by the user, the standard frequency range is 0...2 kHz = 0...measuring range end.

However, the permanently programmed end value can be assigned to any flow value on site.

Programming:

1. Set the maximum flow rate in the system
2. Apply a pulse of a least 0,5 s duration to pin 2 or white strand (with cable outlet) e.g. by jumper to supply voltage or pulse from PLC). The Sensor is now adjusted to 0...max. Output frequency = 0...when programming the set flow rate.
3. After programming, pin 2 (or the white strand) must either remain unconnected or be connected to 0 V.

Electrical connection:



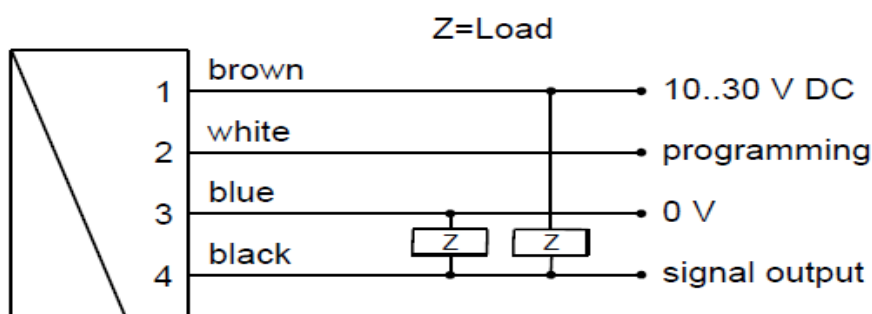
Switching output

With the aid of the integrated sensor, the electronics receives a frequency signal proportional to the flow rate and evaluates it. If the value falls below the set limit value, an alarm signal is output and the yellow LED in the plug connection goes out.

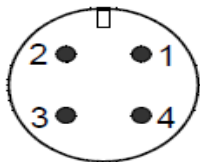
Programming

1. Set the setpoint frequency (= setpoint flow rate) in the system.
2. Apply a pulse of a least 0,5 s duration to pin 2 or white strand (with cable outlet) e.g. by jumper to supply voltage or pulse from PLC). Immediately after programming, the sensor switches to alarm status. The alarm is cancelled as soon as the flow rate has been increased to such an extent that the switching value plus 12 Hz (=hysteresis) is reached.
3. After programming, pin 2 (or the white strand) must either remain unconnected or be connected to 0 V.

Electrical connection:



Connection example: PNP NPN



Analogue output

With the aid of the integrated sensor, the electronics receives a flow-proportional frequency signal and converts it into an analogue output signal. A current signal 4...20 mA is generated in the M7I version and voltage signal 0...10 V in the M7U version.

By default, the analogue output is set to:

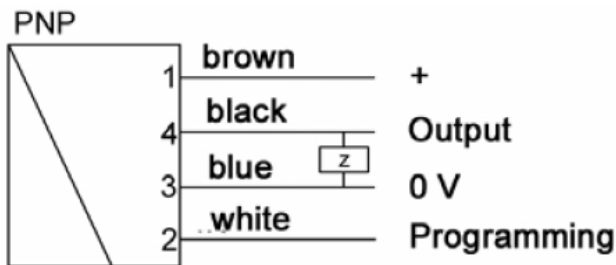
4...20 mA (or 0...10 V) = 0...upper range value set.

This setting can be changed on site as follows:

Programming:

1. Set the setpoint frequency (= setpoint flow rate) in the system.
2. Apply a pulse of a least 0,5 s duration to pin 2 or white strand (with cable outlet) e.g. by jumper to supply voltage or pulse from PLC). The electronics is now programmed so that the set flow corresponds to the maximum value of the analogue output (20 mA bzw. 10 V).
3. After programming, pin 2 (or the white strand) must either remain unconnected or be connected to 0 V.

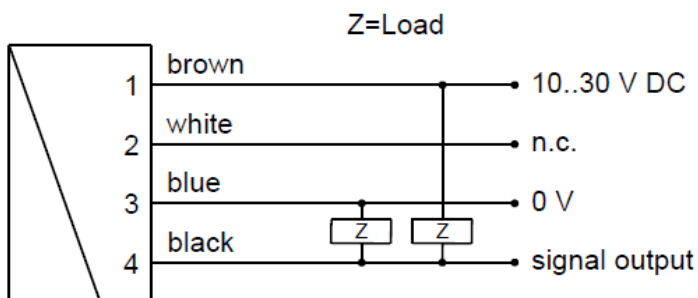
Electrical connection:



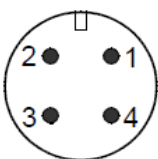
High temperature connection

The high temperature connection for the HT version has a 30 cm remote electronics, for media temperatures up to 150 °C.

Electrical connection:



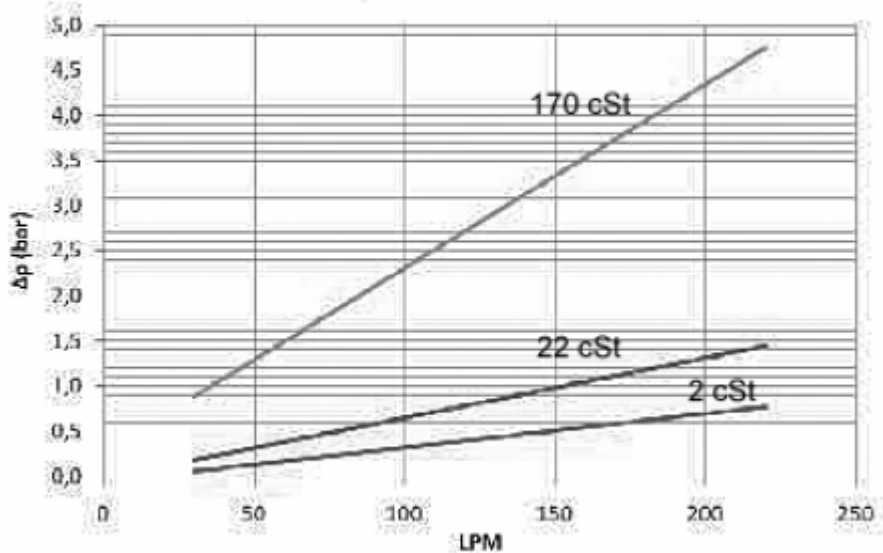
Connection example: PNP NPN



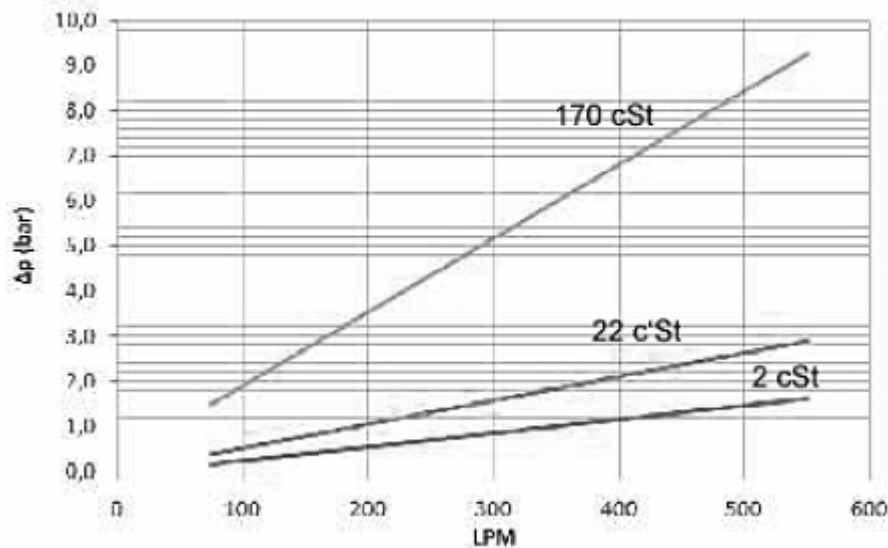
Pressure loss

The pressure loss results from the flow rate and the viscosity of the liquid to be measured. Higher viscosities result in higher pressure loss. Higher viscosities than listed here are easily possible, but require a higher pumping capacity.

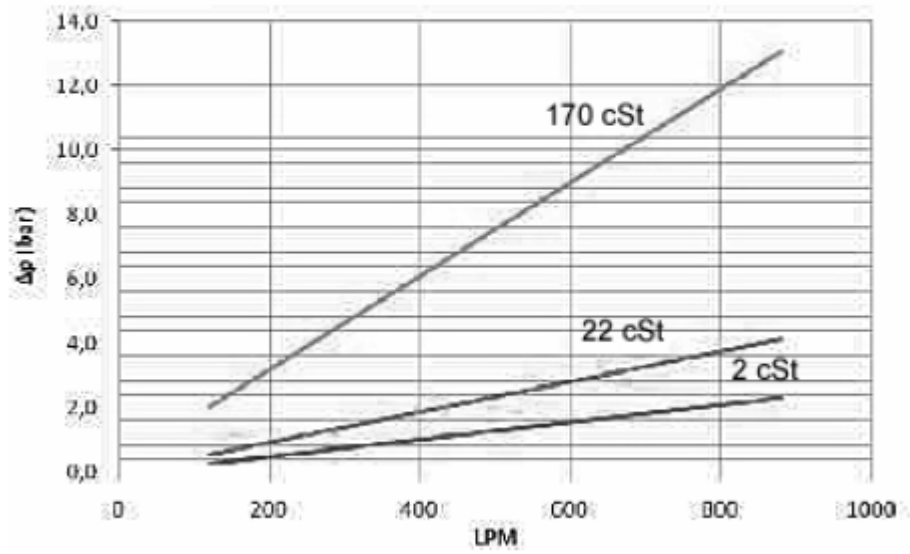
DV08...25 (1")



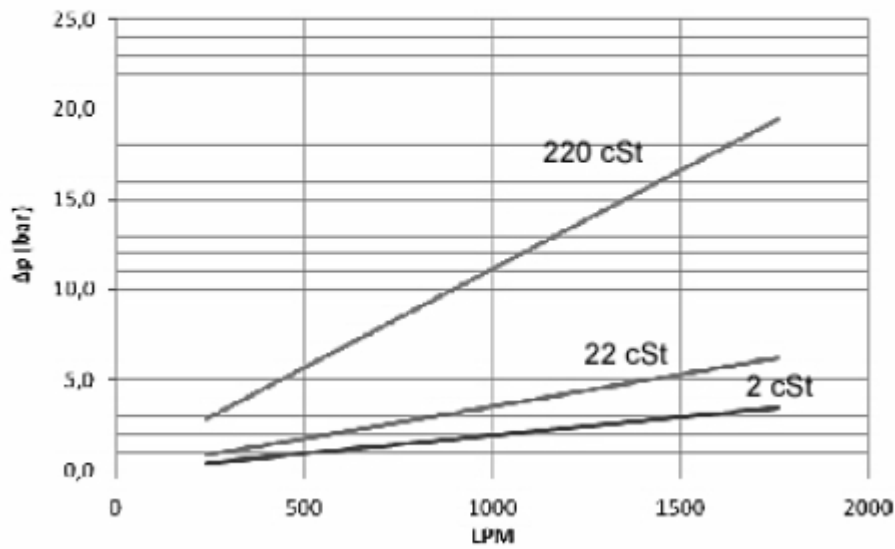
DV08...32 (1 1/4")

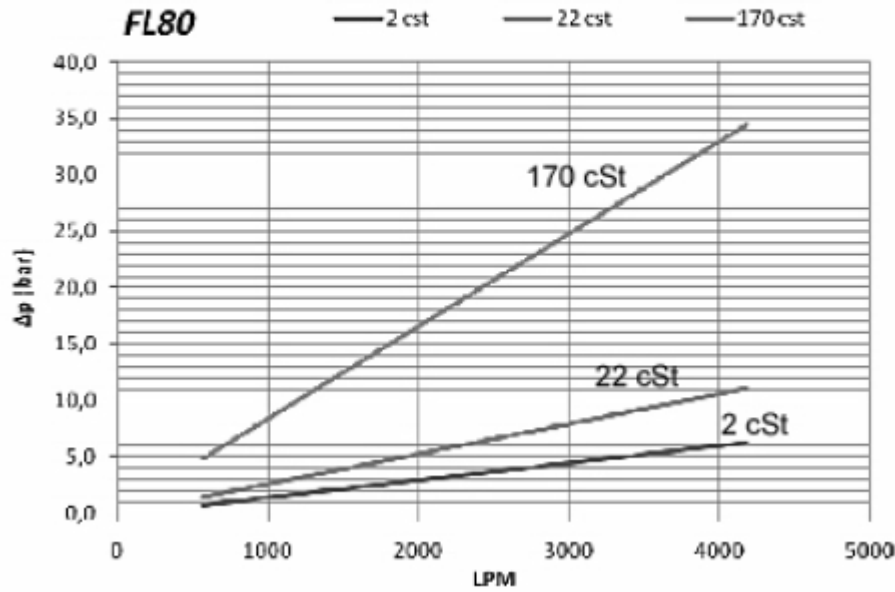


DV08...40 (1 1/2")



DV08...50 (2")

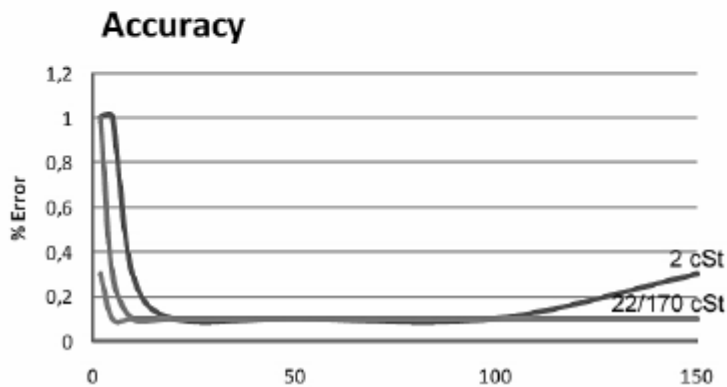
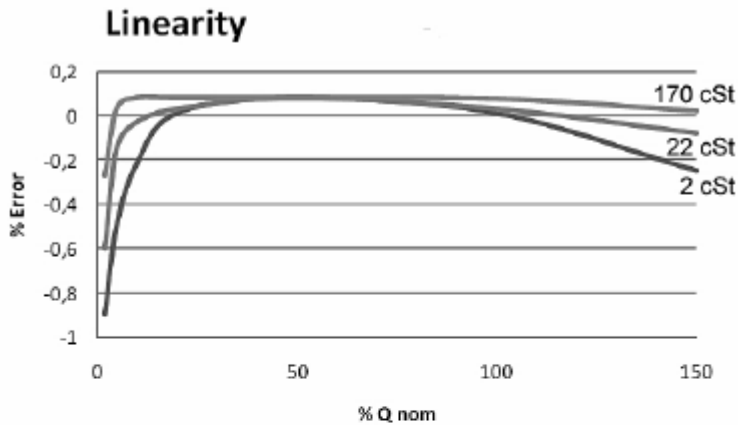




Accuracy

The maximum measuring error is +/- 1 % of the measured value. If the flow ranges are limited to 20 % - 80 % FS, the measurement errors are reduced. If the medium has a viscosity > 170 m²/s, the accuracy is also improved.

Test viscosities were 2 / 22 / 170 mm²/s



DV08

Screw-Spindle Volumetric Flow Meter for Highly Viscous Liquids

- heavy duty design, aluminium housing, max. 160 or 350 bar
- for 1" to 2½" pipe
- unaffected by the viscosity, density or conductivity of the medium
- output signals: pulse signal, programmable frequency output, 4...20 mA, 0...10 V, limit switch
- measuring ranges: 1,4...140 l/min up to 25...2500 l/min
- P_{max}: 350 bar, T_{max}: 80 °C (optionally up to 150 °C)



Description:

The DV08 flow meter is fitted with twin helical screws, which rotate in opposite directions due to the flow of product being monitored. The rotational speed is proportional to the flow rate. The rotary motion of the screws is detected by a sensor which emits two pulses per revolution. Each pulse signal represents a pre-defined volume of product. The flowmeter doesn't have to be taken out of the pipe system for changing the pick-up system because the pick-up is hermetically sealed from the medium. The viscosity of the product has virtually no effect on the DV08 due to the volumetric measurement technique used.

Typical applications:

The DV08 can be used for flow measurement, monitoring and totalizing of liquid, viscous and self-lubricating products up to 40,000 mPas. The device is suitable for use in hydraulic systems, and for lubricant monitoring, metering soaps, pastes and emulsions – to name but a few of its application areas.

Models/Materials:

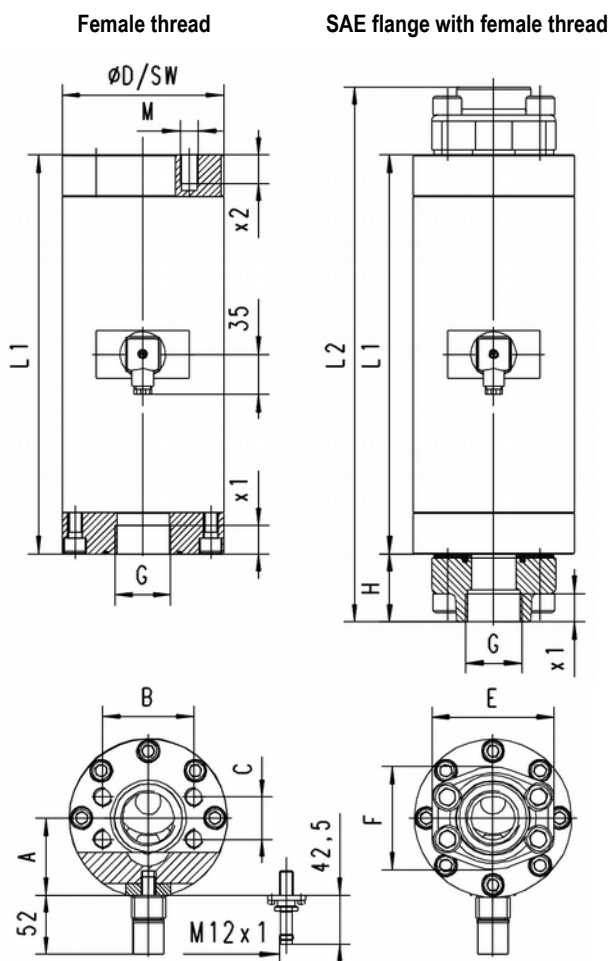
DV08.A...: housing: aluminium 6082
 screw-type spindles: steel 1.4460
 bearing: steel 1.4460
 gaskets: FKM
 process connection: aluminium (160 bar)
 or steel (350 bar)

Measuring ranges:

Conne- ction size	Measuring range* [l/min]	Output frequency at Qmax [Hz]	Process connection	
			Female thread "G" aluminium Pmax. 160 bar	SAE flange with female thread, steel, Pmax. 350 bar
G 1	1,4...140	254,5	GA25	SAE25
G 1 1/4	3,5...350	287,4	GA32	SAE32
G 1 1/2	5,5...550	274,5	GA40A	SAE40A
G 1 1/2	8...800	277,8	GA40	SAE40
G 2	10...1000	257,3	GA50A	SAE40A
G 2	15...1500	275,7	GA50	SAE50
G 2 1/2	25...2500	265,2	GA65	SAE65

* the maximum measuring ranges are indicated in each case. For higher viscosities, the full scale value of the measuring range can be adjusted due to the of a larger differential pressure will be lower.

Dimensions:



Order Code:

Order number: DV08. A. V. GA25. IW. 0

Screw-spindle volumetric
flow meter for highly viscous liquids

Material:

A = aluminium / steel
 S = special order

Gasket:

V = FKM (standard)
 S = special order

Measuring range / Process connection:

GA25 ... SAE65 acc. to table „measuring ranges”
 99 = special connection / special measuring range

Output signal (configurable on site):

IW = pulse output (Push/Pull), cube plug
 IR = pulse output (Push/Pull), round plug M12x1
 M5 = frequency converter (programmable, 0...2 kHz)
 M6 = switch output (limit, programmable)
 M7I = with F/I-converter (output 4...20 mA)
 M7U = with F/ U-converter (output 0...10 V)
 HT = high temperature version
 round plug M12x1

Options:

0 = without
 1 = high temperature version up to 150 °C, 30 cm
 detached electronics (with output HT only)
 2 = encapsulated ball bearings in case of pressure
 fluctuations / -impacts
 9 = please specify in plain text

Accessory:

M12 plug connector with PVC cable:

SM12.4, 4-pole
 2, 5 or 10 m length,
 straight or angled



Technical Data:

Max. pressure:

with thread-
 connection (AL): 160 bar
 with SAE flange: 350 bar

Medium-temperature:

-25...+80 °C
 (optional bis 150 °C)

Accuracy:

± 1% of measured value

Repeatability:

± 0,25%

Medium:

oil or other, non aggressive,
 self-lubricating products

Power supply:

10-30 VDC

Protection class:

IP65

Size table [mm]:

G	x1	x2	L1	L2	ØD	A	B	C	M	H	E	F
G 1	20	20	220	324	88	49	57,1	27,8	12	52	80	69
G 1 1/4	22	22	285	381	103	55	66,7	31,6	14	48	94	77
G 1 1/2	24	24	340	456	138	66,5	79,4	36,5	16	58	106	89
G 2	33	35	405	553	168	77,3	96,8	44,4	20	74	135	116
G 2 1/2	35	42	475	633	203	86	123,8	58,7	24	79	166	150